## **AMENDMENTS TO THE CLAIMS**

- 1. (Original) An apparatus comprising:
  - a first metal electrode layer;
  - a metal nitride layer adjacent to the first metal electrode layer;
  - a polymer ferroelectric layer adjacent to the metal nitride layer;
  - a metal oxide layer adjacent to the polymer ferroelectric layer; and
  - a second metal electrode layer adjacent to the metal oxide layer;
- wherein the metal nitride and metal oxide layers contain excess holes to recombine with electrons injected from the first and second metal electrode layers.
- 2. (Original) The apparatus of claim 1 wherein the first metal electrode layer and second metal electrode layer are tantalum.
- 3. (Original) The apparatus of claim 1 wherein the polymer ferroelectric layer is polyvinylidene fluoride.
- 4. (Original) The apparatus of claim 1 wherein the polymer ferroelectric layer is a polyvinylidene fluoride trifluoroethylene copolymer.
- 5. (Original) The apparatus of claim 1 wherein the metal nitride layer is tantalum nitride.
- 6. (Original) The apparatus of claim 5 wherein the tantalum nitride is doped with hafnium to create excess holes in the tantalum nitride lattice.
- 7. (Original) The apparatus of claim 6 wherein the tantalum nitride has a hole density is approximately between 10^20/cm^3 and 10^21/cm^3.
- 8. (Original) The apparatus of claim 5 wherein the tantalum nitride is deposited in the presence of excess nitrogen to create excess holes in the tantalum nitride lattice.

- 9. (Original) The apparatus of claim 8 wherein the tantalum nitride has a hole density of approximately between 1.8\*10^21/cm^3 and 5.4\*10^21/cm^3.
- 10. (Original) The apparatus of claim 1 wherein the metal oxide layer is tantalum oxide.
- 11. (Original) The apparatus of claim 10 wherein the tantalum oxide layer is doped with hafnium to create excess holes in the tantalum oxide lattice.
- 12. (Original) The apparatus of claim 11 wherein the tantalum oxide has a hole density is approximately between 10^20/cm^3 and 10^21/cm^3.
- 13. (Original) The apparatus of claim 10 wherein the tantalum oxide layer is deposited in the presence of excess oxygen to create excess holes in the tantalum oxide lattice.
- 14. (Original) The apparatus of claim 13 wherein the tantalum oxide has a hole density of approximately between 7\*10^21/cm^3 and 2.1\*10^22/cm^3.
- 15-28. (Canceled)
- 29. (Original) An apparatus comprising:
  - a metal nitride layer;
  - a polymer ferroelectric layer adjacent to the metal nitride layer;
  - a metal oxide layer adjacent to the polymer ferroelectric layer;
  - wherein the metal nitride and metal oxide layers include a plurality of electron traps.
- 30. (Original) The apparatus of claim 29 wherein the polymer ferroelectric layer is polyvinylidene fluoride.
- 31. (Original) The apparatus of claim 29 wherein the polymer ferroelectric layer is a polyvinylidene fluoride trifluoroethylene copolymer.

- 32. (Original) The apparatus of claim 29 wherein the metal nitride layer is tantalum nitride.
- 33. (Original) The apparatus of claim 32 wherein the tantalum nitride is doped with hafnium to create electron traps in the tantalum nitride lattice.
- 34. (Original) The apparatus of claim 32 wherein the tantalum nitride is deposited in the presence of excess nitrogen to create electron traps in the tantalum nitride lattice.
- 35. (Original) The apparatus of claim 29 wherein the metal oxide layer is tantalum oxide.
- 36. (Original) The apparatus of claim 35 wherein the tantalum oxide layer is doped with hafnium to create electron traps in the tantalum oxide lattice.
- 37. (Original) The apparatus of claim 35 wherein the tantalum oxide layer is deposited in the presence of excess oxygen to create electron traps in the tantalum oxide lattice.

38-46. (Canceled)